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ABSTRACT

Developed through a modified DACUM (Developing a Curriculum) process involving business, industry, labor, and community agency representatives in Ohio, this document is a comprehensive and verified employer competency profile for forest industry occupations. The list contains units (with and without subunits), competencies, and competency builders that identify the skills needed to enter these occupations. The occupational, academic, and employability skills for this occupation or occupational area are included. Within the outline are three levels of items: core, advancing, and futuring. Core items identify the knowledge, skills, and attitudes essential for entry-level employment. These items are required to be taught and will be the basis for questions on the state vocational competency tests. Advancing items identify the knowledge, skills, and attitudes needed to advance in the occupation; futuring items identify the knowledge, skills, and attitudes needed to enter and remain in a given occupation 3 to 4 years from now. Titles of the 14 units are as follows: general safety precautions; forest industry operations; forest nursery operations; forest measurements; forest establishment; forest management; tree harvesting and processing; wildland fire operations; forestry equipment maintenance; forestry equipment operation; construction skills; business management; urban forestry tree care; and employability skills. (YLB)

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OCAP

OHIO'S COMPETENCY ANALYSIS PROFILE

FOREST INDUSTRY WORKER

U.S. DEPARTMENT OF EDUCATION
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Ohio's Future at Work

Division of Vocational and Career Education
Ohio Department of Education

Vocational Instructional Materials Laboratory
Center on Education and Training for Employment

THE OHIO STATE UNIVERSITY

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What is OCAP?

"A comprehensive and verified employer competency list will be developed and kept current for each program." This is the second objective of Imperative 3 of the *Action Plan for Accelerating the Modernization of Vocational Education: Ohio's Future at Work*. Ohio's Competency Analysis Profile (OCAP) lists are the Division of Vocational and Career Education's response to that objective. OCAP lists evolve from a modified DACUM process involving business, industry, labor, and community agency representatives from throughout Ohio. The OCAP process is directed by the Vocational Instructional Materials Laboratory at The Ohio State University's Center on Education and Training for Employment.

How is OCAP used?

Each OCAP contains units (with and without subunits), competencies, and competency builders that identify the occupational, academic,* and employability skills needed to enter a given occupation or occupational area. Within that outline there are three levels of items: core, advancing, and futuring. Core items identify the knowledge, skills, and attitudes essential for entry-level employment. These items will be the basis for questions on the state vocational competency tests (scheduled to begin in school year 1993-94). Advancing items (marked with one asterisk) identify the knowledge, skills, and attitudes needed to advance in a given occupation. Futuring items (marked with two asterisks) identify the knowledge, skills, and attitudes needed to enter and remain in a given occupation three to four years from now.

School districts may add as many units, subunits, competencies, and/or competency builders as desired to reflect local employment needs, trends, and specialties. Local advisory committees should be actively involved in the identification and verification of additional items. Using OCAP lists, instructors will be able to formulate their vocational courses of study and monitor competency gains via the new criterion-referenced competency testing program that will be directly tied to the competencies identified on the OCAP lists.

***Academic competencies have not been identified for all OCAPs. At a later date math, communication, and science competencies will be released.**

The **Employability Skills** portion of this list was verified by the following employer panel:

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Ohio Competency Analysis Profile
Forest Industry Worker

Unit 1: General Safety Precautions

Competency 1.0.1: Maintain safe work environment

Competency Builders:

1.0.1.1 Read and follow safety information
1.0.1.2 Organize and maintain clean and safe work area
1.0.1.3 Recognize dangers of hazardous materials
1.0.1.4 Identify purpose of material safety data sheets (MSDSs)
1.0.1.5 Comply with shop and equipment safety rules
1.0.1.6 Complete accident report
1.0.1.7 Identify agencies that regulate aspects of forest industry
1.0.1.8 Recognize major environmental issues pertaining to forest industry
1.0.1.9 Identify and report safety hazards
1.0.1.10 Maintain and use safety devices
1.0.1.11 Comply with general-use and restricted-use product regulations
1.0.1.12 Comply with responder first-aid and cardiopulmonary resuscitation (CPR) certification standards
1.0.1.13 Correct safety hazards*
1.0.1.14 Monitor regulation updates*

Competency 1.0.2: Demonstrate safe work habits

Competency Builders:

1.0.2.1 Read and follow label information
1.0.2.2 Wear and maintain protective clothing and equipment
1.0.2.3 Wear appropriate clothing for job
1.0.2.4 Use safe lifting and carrying methods
1.0.2.5 Determine physical needs for specific occupational tasks
1.0.2.6 Interpret information on signs
1.0.2.7 Check fit of respirator
1.0.2.8 Check and maintain working condition of respirator
1.0.2.9 Comply with safety precautions when applying chemicals and fertilizer
1.0.2.10 Comply with safety precautions when storing chemicals and fertilizer
1.0.2.11 Follow personal cleanup procedures after handling chemicals and fertilizer
1.0.2.12 Clean up and dispose of chemicals and chemical containers according to manual specifications and/or government regulations
1.0.2.13 Comply with safety precautions when handling chemical or fertilizer spill
1.0.2.14 Develop physical fitness program to achieve level of conditioning for job

* Advancing
** Futuring

Competency 1.0.3: Operate and maintain equipment

Competency Builders:

1.0.3.1 Follow safety rules for equipment operation and maintenance
1.0.3.2 Comply with safety zones around equipment
1.0.3.3 Operate equipment defensively
1.0.3.4 Interpret safety symbols
1.0.3.5 Maintain safety devices on all equipment
1.0.3.6 Shut down and lock out/tag out power equipment before servicing
1.0.3.7 Identify and take appropriate action to correct potential equipment safety hazards
1.0.3.8 Follow manufacturer's service recommendations
1.0.3.9 Maintain and use slow-moving-vehicle signs when operating vehicles on road
1.0.3.10 Keep riders off mobile equipment

Unit 2: Forest Industry Operations

Competency 2.0.1: Evaluate forest industry

Competency Builders:

2.0.1.1 Identify fields of endeavor
2.0.1.2 Identify types of forest products
2.0.1.3 Recognize economic importance of industry
2.0.1.4 Recognize environmental importance of industry
2.0.1.5 Identify employment opportunities
2.0.1.6 Recognize regulatory aspects of industry
2.0.1.7 Identify continuing-education opportunities
2.0.1.8 Identify professional organizations and trade journals
2.0.1.9 Identify state licensing or certification requirements
2.0.1.10 Use proper industry terminology

Competency 2.0.2: Identify common trees and associated plants

Competency Builders:

2.0.2.1 Classify plants as monocots or dicots
2.0.2.2 Identify common plants by scientific and common names
2.0.2.3 Classify plants as annuals, biennials, or perennials
2.0.2.4 Identify environmental plant preferences
2.0.2.5 Classify plants according to growth habit
2.0.2.6 Identify leaf type
2.0.2.7 Identify twig features
2.0.2.8 Identify bark features
2.0.2.9 Identify types of fruits and seeds
2.0.2.10 Identify root components
2.0.2.11 Classify trees by crown position
2.0.2.12 Classify stand of timber by forest type
2.0.2.13 Classify timber stand by size class
2.0.2.14 Classify trees by economic value

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Competency 2.0.3: Examine plant processes

Competency Builders:

2.0.3.1 Identify photosynthesis process
2.0.3.2 Identify functions of plant parts
2.0.3.3 Identify requirements for healthy plant growth
2.0.3.4 Identify areas of growth on individual trees
2.0.3.5 Identify physical factors affecting forest environment
2.0.3.6 Identify biological factors affecting forest environment
2.0.3.7 Identify physical and chemical characteristics of wood
2.0.3.8 Take core sample
2.0.3.9 Measure tree growth
2.0.3.10 Measure growth rate

Unit 3: Forest Nursery Operations

Competency 3.0.1: Prepare nursery site

Competency Builders:

3.0.1.1 Follow general safety precautions
3.0.1.2 Identify features to consider in selecting site
3.0.1.3 Identify factors involved in planning propagation facilities
3.0.1.4 Till and cultivate site
3.0.1.5 Identify basics of greenhouse structures
3.0.1.6 Recognize purpose and function of greenhouse

Competency 3.0.2: Prepare for propagation

Competency Builders:

3.0.2.1 Follow general safety precautions
3.0.2.2 Identify asexual and sexual plant propagation methods
3.0.2.3 Collect and/or obtain seeds
3.0.2.4 Take cuttings
3.0.2.5 Interpret plant and seed tag information
3.0.2.6 Match plant requirements to environmental conditions
3.0.2.7 Calculate percent germination
3.0.2.8 Treat seeds
3.0.2.9 Identify factors for determining planting rate
3.0.2.10 Identify factors for determining planting depth
3.0.2.11 Identify factors for determining planting time
3.0.2.12 Select containers
3.0.2.13 Sterilize equipment, containers, and seedbed
3.0.2.14 Apply propagation media principles

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Competency 3.0.3: Propagate tree seedlings and cuttings

Competency Builders:

3.0.3.1 Follow general safety precautions
3.0.3.2 Stratify seeds
3.0.3.3 Plant seeds
3.0.3.4 Apply rooting hormone
3.0.3.5 Stick cuttings
3.0.3.6 Set plant spacing

Competency 3.0.4: Handle and care for seedlings and cuttings

Competency Builders:

3.0.4.1 Follow general safety precautions
3.0.4.2 Thin seedlings
3.0.4.3 Transplant seedlings and plugs
3.0.4.4 Transplant cuttings
3.0.4.5 Apply growth-regulating compounds
3.0.4.6 Prune roots
3.0.4.7 Lift seedlings and cuttings
3.0.4.8 Package plants
3.0.4.9 Ship plants
3.0.4.10 Keep nursery production records
3.0.4.11 Identify problems

Competency 3.0.5: Regulate nursery environment

Competency Builders:

3.0.5.1 Follow general safety precautions
3.0.5.2 Install shade cloth
3.0.5.3 Construct lath
3.0.5.4 Use light meters
3.0.5.5 Control humidity
3.0.5.6 Control temperature
3.0.5.7 Control moisture
3.0.5.8 Determine fertilizer levels

Competency 3.0.6: Service water systems

Competency Builders:

3.0.6.1 Follow general safety precautions
3.0.6.2 Open and close trench line
3.0.6.3 Locate existing underground waterlines
3.0.6.4 Cut pipe or tubing
3.0.6.5 Thread metal pipe
3.0.6.6 Fit pipe and pipe fittings
3.0.6.7 Install and repair valves and faucets
3.0.6.8 Install insulation
3.0.6.9 Install filters
3.0.6.10 Replace gaskets

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3.0.6.11 Unclog pipes
3.0.6.12 Install sprinkler heads
3.0.6.13 Winterize system
3.0.6.14 Troubleshoot problems

Competency 3.0.7: Operate irrigation systems

Competency Builders:

3.0.7.1 Follow general safety precautions
3.0.7.2 Adjust sprinkler patterns
3.0.7.3 Determine sprinkler precipitation rate
3.0.7.4 Program automatic timers
3.0.7.5 Troubleshoot problems

Unit 4: Forest Measurements

Competency 4.0.1: Interpret maps

Competency Builders:

4.0.1.1 Identify sources of maps
4.0.1.2 Identify meridians and parallels
4.0.1.3 Interpret deed
4.0.1.4 Locate administrative land divisions
4.0.1.5 Identify what public records are available
4.0.1.6 Use United States Public Land Survey System
4.0.1.7 Determine distance
4.0.1.8 Determine direction
4.0.1.9 Identify natural features
4.0.1.10 Identify man-made features
4.0.1.11 Interpret map legends
4.0.1.12 Interpret information on topographic map
4.0.1.13 Triangulate location
4.0.1.14 Orient map to true north
4.0.1.15 Use compass
4.0.1.16 Use city or area road map
4.0.1.17 Recognize use of aerial photographs
4.0.1.18 Interpret aerial photographs*
4.0.1.19 Measure horizontal distances*
4.0.1.20 Measure vertical distances*
4.0.1.21 Take area measurements*
4.0.1.22 Determine boundary lines*
4.0.1.23 Locate logging and access roads*
4.0.1.24 Locate dams, impoundments, ponds, and recreational-use areas*
4.0.1.25 Calculate slope*
4.0.1.26 Determine magnetic declination*
4.0.1.27 Recognize Best Management Practices (BMP)*

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Competency 4.0.2: Conduct survey*

Competency Builders:

4.0.2.1 Follow general safety precautions*
4.0.2.2 Clear brush*
4.0.2.3 Transport survey instruments*
4.0.2.4 Set up survey instruments*
4.0.2.5 Perform long-distance survey approximations*
4.0.2.6 Determine elevation*
4.0.2.7 Measure inaccessible lines*

Competency 4.0.3: Cruise timber

Competency Builders:

4.0.3.1 Follow general safety precautions
4.0.3.2 Select cruise type
4.0.3.3 Mark timber
4.0.3.4 Evaluate soil conditions
4.0.3.5 Identify topographic features
4.0.3.6 Identify desirable tree species
4.0.3.7 Identify symptoms of internal tree problems
4.0.3.8 Identify symptoms of external tree problems
4.0.3.9 Measure tree height
4.0.3.10 Measure tree diameter
4.0.3.11 Measure basal area
4.0.3.12 Calculate number of trees in stand
4.0.3.13 Calculate stand volume in board footage and weight using Doyle and international rules
4.0.3.14 Calculate stumpage value
4.0.3.15 Calculate number of logs and sticks in tree
4.0.3.16 Calculate total board footage
4.0.3.17 Record measurements
4.0.3.18 Prepare inventory reports
4.0.3.19 Prepare stand analysis data

Competency 4.0.4: Scale pulpwood and sawlogs

Competency Builders:

4.0.4.1 Follow general safety precautions
4.0.4.2 Measure length and diameter
4.0.4.3 Estimate board footage using Doyle and international rules
4.0.4.4 Calculate volume of pulpwood
4.0.4.5 Calculate volume of sawlogs using various methods
4.0.4.6 Scale pulpwood by weight
4.0.4.7 Scale logs by computer*

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Competency 4.0.5: Grade sawlogs

Competency Builders:

4.0.5.1 Follow general safety precautions
4.0.5.2 Observe defects
4.0.5.3 Identify desirable length
4.0.5.4 Identify clear faces
4.0.5.5 Identify log species

Unit 5: Forest Establishment

Competency 5.0.1: Evaluate watershed management*

Competency Builders:

5.0.1.1 Control flood runoff*
5.0.1.2 Maintain soil stability*
5.0.1.3 Improve vegetative cover*
5.0.1.4 Recognize lands that may be classed as wetlands*

Competency 5.0.2: Evaluate soil characteristics

Competency Builders:

5.0.2.1 Determine soil drainage
5.0.2.2 Identify soil texture
5.0.2.3 Determine percent organic matter
5.0.2.4 Identify soil structure and type
5.0.2.5 Identify soil horizons
5.0.2.6 Determine slope
5.0.2.7 Determine soil use capability
5.0.2.8 Determine soil management problems
5.0.2.9 Comply with government regulations and guidelines
5.0.2.10 Determine and implement management and conservation practices*

Competency 5.0.3: Prepare for plant and soil testing

Competency Builders:

5.0.3.1 Collect soil samples
5.0.3.2 Prepare soil samples
5.0.3.3 Take plant samples
5.0.3.4 Prepare plant samples
5.0.3.5 Interpret test results

Competency 5.0.4: Prepare to plant trees

Competency Builders:

5.0.4.1 Follow general safety precautions
5.0.4.2 Calculate planting rate
5.0.4.3 Transport seedlings
5.0.4.4 Care for and store seedlings
5.0.4.5 Select planting site for urban and forest environment*
5.0.4.6 Define planting areas*
5.0.4.7 Plan access roads*
5.0.4.8 Plan soil erosion control*
5.0.4.9 Procure planting stock*
5.0.4.10 Design plantings by computer**

Competency 5.0.5: Plant trees

Competency Builders:

5.0.5.1 Follow general safety precautions
5.0.5.2 Protect planting stock
5.0.5.3 Prepare planting location in urban and forest environments
5.0.5.4 Determine factors that affect plant survival
5.0.5.5 Line out planting location
5.0.5.6 Determine planting procedure
5.0.5.7 Plant trees in urban and forest environments
5.0.5.8 Keep planting records
5.0.5.9 Provide care and maintenance for newly planted trees
5.0.5.10 Determine reclamation replant practices*
5.0.5.11 Establish hardwoods in open fields**

Unit 6: Forest Management

Competency 6.0.1: Improve timber stand

Competency Builders:

6.0.1.1 Follow general safety precautions
6.0.1.2 Describe process and function of controlled burning
6.0.1.3 Remove undesirable tree and brush species
6.0.1.4 Thin trees
6.0.1.5 Perform cleaning operations
6.0.1.6 Perform crop tree release
6.0.1.7 Conduct improvement cutting
6.0.1.8 Girdle trees
6.0.1.9 Prune trees

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Competency 6.0.2: Fertilize trees

Competency Builders:

6.0.2.1 Follow general safety precautions
6.0.2.2 Identify symptoms of nutrient deficiency
6.0.2.3 Select soil amendments
6.0.2.4 Interpret manufacturer's fertilization-rate charts
6.0.2.5 Interpret fertilizer labels
6.0.2.6 Determine amount of fertilizer and soil amendments to apply
6.0.2.7 Select application method
6.0.2.8 Calibrate fertilizer application equipment
6.0.2.9 Mix fertilizer solutions
6.0.2.10 Apply liquid fertilizer
6.0.2.11 Apply dry fertilizer
6.0.2.12 Recognize symptoms of fertilizer injury
6.0.2.13 Maintain equipment
6.0.2.14 Keep fertilizer application records
6.0.2.15 Identify injection method for applying micronutrients to trees in urban forestry
6.0.2.16 Determine nutrient requirements*
6.0.2.17 Develop fertilization schedule*

Competency 6.0.3: Apply pest-control principles

Competency Builders:

6.0.3.1 Follow general safety precautions
6.0.3.2 Classify insects according to feeding habits
6.0.3.3 Recognize various pest damage
6.0.3.4 Estimate pest population numbers
6.0.3.5 Calculate area to be covered
6.0.3.6 Prepare maps of infested areas
6.0.3.7 Evaluate chemical/cultural/biological control options
6.0.3.8 Prepare pest damage samples
6.0.3.9 Identify common insects, diseases, and weeds*
6.0.3.10 Identify common vertebrate pests*
6.0.3.11 Assess degree of damage*
6.0.3.12 Determine when controls are needed*
6.0.3.13 Select control methods*

Competency 6.0.4: Apply chemical pest-control treatments

Competency Builders:

6.0.4.1 Follow general safety precautions
6.0.4.2 Comply with information on chemical labels
6.0.4.3 Calibrate application equipment
6.0.4.4 Mix chemicals
6.0.4.5 Use application equipment
6.0.4.6 Set out bait
6.0.4.7 Clean equipment
6.0.4.8 Recognize chemical injury
6.0.4.9 Maintain application record
6.0.4.10 Comply with government regulations

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6.0.4.11 Follow integrated pest management (IPM) practices
6.0.4.12 Identify injection methods for applying pesticides to trees in urban environments
6.0.4.13 Comply with information on compatibility charts*
6.0.4.14 Select chemicals*
6.0.4.15 Assess treatment results*

Competency 6.0.5: Apply nonchemical pest control

Competency Builders:

6.0.5.1 Follow general safety precautions
6.0.5.2 Mow fields
6.0.5.3 Spread mulches
6.0.5.4 Till for weed control
6.0.5.5 Plan livestock grazing
6.0.5.6 Identify pest-resistant species
6.0.5.7 Recognize biological control products or processes
6.0.5.8 Follow IPM practices
6.0.5.9 Plant cover crops*

Competency 6.0.6: Shear Christmas trees

Competency Builders:

6.0.6.1 Follow general safety precautions
6.0.6.2 Identify purpose and response of shearing by species
6.0.6.3 Remove multiple leaders
6.0.6.4 Shear lateral branches
6.0.6.5 Train terminal leaders
6.0.6.6 Identify shearing equipment
6.0.6.7 Use motorized tools in shearing process
6.0.6.8 Maintain shearing equipment
6.0.6.9 Put handles on trees (i.e., remove lower branches)
6.0.6.10 Select type of tree taper*
6.0.6.11 Schedule shearing time according to species*

Unit 7: Tree Harvesting and Processing

Competency 7.0.1: Harvest nonforest trees

Competency Builders:

7.0.1.1 Follow general safety precautions
7.0.1.2 Comply with tree inspection and movement regulations
7.0.1.3 Dye trees
7.0.1.4 Dig, ball, and burlap trees
7.0.1.5 Cut trees
7.0.1.6 Tie trees
7.0.1.7 Bale trees

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7.0.1.8 Identify industry standards regarding tree harvesting
7.0.1.9 Store trees
7.0.1.10 Identify options of machinery for harvesting
7.0.1.11 Identify market demand*
7.0.1.12 Schedule harvest*

Competency 7.0.2: Harvest forest trees*

Competency Builders:

7.0.2.1 Follow general safety precautions*
7.0.2.2 Plan harvest time*
7.0.2.3 Identify access-road requirements*
7.0.2.4 Design stream crossings*
7.0.2.5 Plan erosion control*
7.0.2.6 Recommend logging methods*
7.0.2.7 Fell tree*
7.0.2.8 Limb tree*
7.0.2.9 Cut tree into log lengths*
7.0.2.10 Chip tree parts*
7.0.2.11 Identify Best Management Practices (BMP)*
7.0.2.12 Identify reclamation practices*

Competency 7.0.3: Haul wood products*

Competency Builders:

7.0.3.1 Follow general safety precautions*
7.0.3.2 Select vehicle*
7.0.3.3 Load logs*
7.0.3.4 Determine delivery route*
7.0.3.5 Comply with federal and state laws and regulations*
7.0.3.6 Prepare transport records*

Competency 7.0.4: Operate sawmill*

Competency Builders:

7.0.4.1 Follow general safety precautions*
7.0.4.2 Identify sawmill types*
7.0.4.3 Use hardwood sawing techniques*
7.0.4.4 Use softwood sawing techniques*
7.0.4.5 Identify knot types*
7.0.4.6 Identify log defects*
7.0.4.7 Identify basic lumber-grading techniques*
7.0.4.8 Identify special-use log markets*
7.0.4.9 Use common sawmill equipment*
7.0.4.10 Identify sawmill by-product uses*
7.0.4.11 Cut logs using computer program**

* Advancing
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Competency 7.0.5: Season lumber*

Competency Builders:

7.0.5.1 Follow general safety precautions*
7.0.5.2 Estimate expected shrinkage*
7.0.5.3 Choose site*
7.0.5.4 Build foundation*
7.0.5.5 Stack lumber*
7.0.5.6 Use stickers*
7.0.5.7 Pile lumber*
7.0.5.8 Protect piles from weather*
7.0.5.9 Identify lumber defects*
7.0.5.10 Identify techniques to protect and maintain quality of lumber*
7.0.5.11 Identify causes of seasoning defects*
7.0.5.12 Identify drying techniques*

Unit 8: Wildland Fire Operations

Competency 8.0.1: Practice wildland fire safety

Competency Builders:

8.0.1.1 Follow general safety precautions
8.0.1.2 Identify safety areas
8.0.1.3 Use fire shelter
8.0.1.4 Use protective equipment
8.0.1.5 Recognize situations producing explosive fire behavior
8.0.1.6 Identify actions for each of the letters in FIRE ORDERS
8.0.1.7 Identify Watch Out situations
8.0.1.8 Plan escape route*
8.0.1.9 Recognize need for Incident Command System (ICS)*

Competency 8.0.2: Suppress fires

Competency Builders:

8.0.2.1 Follow general safety precautions
8.0.2.2 Identify items that influence fire behavior
8.0.2.3 Construct control handline
8.0.2.4 Recognize man-made and natural barriers to fires
8.0.2.5 Recognize threats to control lines
8.0.2.6 Recognize types of attack
8.0.2.7 Identify fire triangle
8.0.2.8 Identify parts of fire
8.0.2.9 Identify and maintain hand tools
8.0.2.10 Recognize wildland-urban interface problems*

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Competency 8.0.3: Practice mop-up operations

Competency Builders:

8.0.3.1 Follow general safety precautions
8.0.3.2 Extinguish burning materials
8.0.3.3 Locate hot spots
8.0.3.4 Use cold trailing procedures
8.0.3.5 Identify safety hazards

Competency 8.0.4: Manage watering of fires*

Competency Builders:

8.0.4.1 Follow general safety precautions*
8.0.4.2 Design a hose-lay*
8.0.4.3 Use hose-lay appliances*
8.0.4.4 Inspect hoses and appliances*
8.0.4.5 Set up pump chase*
8.0.4.6 Set up collapsible tank*
8.0.4.7 Add surfactant to water source*
8.0.4.8 Practice water conservation*
8.0.4.9 Retrieve hose and accessories*
8.0.4.10 Prepare hose for transport*
8.0.4.11 Make and deploy hose packs*
8.0.4.12 Add to or replace charged hose-lay section*
8.0.4.13 Select and adjust pressure*
8.0.4.14 Use hand signals*
8.0.4.15 Identify foam application techniques*
8.0.4.16 Set up and operate pump*

Competency 8.0.5: Identify weather conditions

Competency Builders:

8.0.5.1 Observe weather conditions
8.0.5.2 Use weather-recording instruments
8.0.5.3 Record weather measurements

Unit 9: Forestry Equipment Maintenance

Competency 9.0.1: Maintain equipment

Competency Builders:

9.0.1.1 Follow general safety precautions
9.0.1.2 Calibrate equipment
9.0.1.3 Adjust belts
9.0.1.4 Adjust chains
9.0.1.5 Inspect and report operating defects
9.0.1.6 Clean and lubricate parts
9.0.1.7 Sharpen equipment
9.0.1.8 Maintain service records

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** Futuring

Competency 9.0.2: Maintain chain saw

Competency Builders:

9.0.2.1 Follow general safety precautions
9.0.2.2 Remove and install saw guide, bar, and chain
9.0.2.3 Adjust chain tension
9.0.2.4 Sharpen chain
9.0.2.5 Service guide bar and chain
9.0.2.6 Replace chain
9.0.2.7 Service air filter
9.0.2.8 Service spark plug
9.0.2.9 Service exhaust system
9.0.2.10 Perform spark test
9.0.2.11 Inspect fuel system

Competency 9.0.3: Maintain spraying equipment

Competency Builders:

9.0.3.1 Follow general safety precautions
9.0.3.2 Clean and inspect spray nozzles
9.0.3.3 Select spray nozzles
9.0.3.4 Calibrate equipment
9.0.3.5 Inspect hose and connections
9.0.3.6 Pressure-check hoses
9.0.3.7 Clean and inspect tanks
9.0.3.8 Repair hose
9.0.3.9 Troubleshoot problems

Competency 9.0.4: Service engine cooling systems

Competency Builders:

9.0.4.1 Follow general safety precautions
9.0.4.2 Test coolant mixture
9.0.4.3 Add coolant
9.0.4.4 Replace hoses
9.0.4.5 Adjust or replace fan belt
9.0.4.6 Inspect for leaks
9.0.4.7 Troubleshoot problems

Competency 9.0.5: Service engine lubrication systems

Competency Builders:

9.0.5.1 Follow general safety precautions
9.0.5.2 Check oil level
9.0.5.3 Select oil
9.0.5.4 Change oil and oil filters
9.0.5.5 Grease or oil joints
9.0.5.6 Maintain grease fittings

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Competency 9.0.6: Service engine fuel and air systems

Competency Builders:

9.0.6.1 Follow general safety precautions
9.0.6.2 Service air cleaner
9.0.6.3 Bleed diesel fuel system
9.0.6.4 Mix gas and oil for two-cycle engine
9.0.6.5 Clean and service crankcase ventilation components
9.0.6.6 Clean carburetor
9.0.6.7 Adjust small-engine carburetor
9.0.6.8 Service fuel filter assembly
9.0.6.9 Replace exhaust system components
9.0.6.10 Clean small-engine exhaust ports
9.0.6.11 Adjust engine valves
9.0.6.12 Troubleshoot problems

Competency 9.0.7: Service engine electrical systems

Competency Builders:

9.0.7.1 Follow general safety precautions
9.0.7.2 Inspect and replace distributor cap and rotor
9.0.7.3 Replace spark plugs and wires
9.0.7.4 Clean spark plugs
9.0.7.5 Adjust spark plug gap
9.0.7.6 Inspect and adjust/change breaker points
9.0.7.7 Check specific gravity of battery
9.0.7.8 Install battery
9.0.7.9 Clean and treat battery terminals, cables, and battery box
9.0.7.10 Charge battery
9.0.7.11 Replace fuses and light bulbs
9.0.7.12 Troubleshoot problems

Competency 9.0.8: Service wheels and tires

Competency Builders:

9.0.8.1 Follow general safety precautions
9.0.8.2 Check tire pressure
9.0.8.3 Inflate tires
9.0.8.4 Check and tighten lug nuts
9.0.8.5 Remove and replace wheels
9.0.8.6 Rotate tires
9.0.8.7 Check valve stems
9.0.8.8 Patch tubes
9.0.8.9 Troubleshoot problems

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Competency 9.0.9: Service hydraulic systems

Competency Builders:

9.0.9.1 Follow general safety precautions
9.0.9.2 Identify reservoir
9.0.9.3 Select oil
9.0.9.4 Check and add oil
9.0.9.5 Replace oil filter
9.0.9.6 Bleed air from system
9.0.9.7 Inspect system for oil leaks
9.0.9.8 Clean couplings
9.0.9.9 Replace hoses
9.0.9.10 Troubleshoot problems

Competency 9.0.10: Clean and store equipment

Competency Builders:

9.0.10.1 Follow general safety precautions
9.0.10.2 Remove equipment from storage
9.0.10.3 Remove debris
9.0.10.4 Use steam or high-pressure wash equipment
9.0.10.5 Lubricate equipment
9.0.10.6 Drain water systems
9.0.10.7 Return equipment to storage

Unit 10: Forestry Equipment Operation

Competency 10.0.1: Perform equipment prestart functions

Competency Builders:

10.0.1.1 Follow general safety precautions
10.0.1.2 Connect front-end-operated equipment
10.0.1.3 Connect 3-point-hitch equipment
10.0.1.4 Attach and detach power takeoff equipment
10.0.1.5 Hitch towed equipment
10.0.1.6 Connect hydraulic lines
10.0.1.7 Connect electrical hookups
10.0.1.8 Connect safety chains
10.0.1.9 Refuel power units
10.0.1.10 Inspect working conditions of lights
10.0.1.11 Secure equipment and materials

Competency 10.0.2: Operate equipment and vehicles

Competency Builders:

10.0.2.1 Follow general safety precautions
10.0.2.2 Set throttle for operating conditions
10.0.2.3 Interpret equipment gauges
10.0.2.4 Start and shut down engine
10.0.2.5 Use hand operating signals
10.0.2.6 Operate manual transmission
10.0.2.7 Operate automatic transmission
10.0.2.8 Operate brake system
10.0.2.9 Adjust seating and steering
10.0.2.10 Preheat diesels
10.0.2.11 Park equipment and vehicles
10.0.2.12 Operate liftgates
10.0.2.13 Operate dump gates
10.0.2.14 Operate winch
10.0.2.15 Adjust equipment for field conditions
10.0.2.16 Comply with all government regulations regarding equipment operation

Competency 10.0.3: Operate chain saw

Competency Builders:

10.0.3.1 Follow general safety precautions
10.0.3.2 Identify chain saw parts
10.0.3.3 Identify parts of saw chain
10.0.3.4 Conduct preoperating maintenance inspection
10.0.3.5 Start saw
10.0.3.6 Make overbuck cut
10.0.3.7 Make underbuck cut
10.0.3.8 Determine tree's line of fall
10.0.3.9 Identify use of wedges in felling operation

Unit 11: Construction Skills

Competency 11.0.1: Use and maintain hand, power, and pneumatic tools

Competency Builders:

11.0.1.1 Follow general safety precautions
11.0.1.2 Identify tools
11.0.1.3 Select tools
11.0.1.4 Follow operation instructions
11.0.1.5 Set up and adjust tools
11.0.1.6 Clean and lubricate tools
11.0.1.7 Store tools
11.0.1.8 Recondition tools*

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Competency 11.0.2: Install and maintain fencing

Competency Builders:

11.0.2.1 Follow general safety precautions
11.0.2.2 Identify fencing system options
11.0.2.3 Determine amount of materials required
11.0.2.4 Select fencing materials
11.0.2.5 Select posts and braces
11.0.2.6 Set posts and braces
11.0.2.7 Attach fasteners
11.0.2.8 Hang fence
11.0.2.9 Hang gates

Unit 12: Business Management

Competency 12.0.1: Perform general office duties

Competency Builders:

12.0.1.1 Process mail
12.0.1.2 Duplicate materials
12.0.1.3 File materials
12.0.1.4 Prepare correspondence
12.0.1.5 Prepare reports
12.0.1.6 Secure business documents
12.0.1.7 Schedule appointments and meetings
12.0.1.8 Plan work schedules
12.0.1.9 Open and close business facility
12.0.1.10 Use telephone
12.0.1.11 Operate calculator
12.0.1.12 Use two-way radio
12.0.1.13 Operate computer
12.0.1.14 Use FAX machine
12.0.1.15 Maintain service records

Competency 12.0.2: Conduct general banking procedures

Competency Builders:

12.0.2.1 Prepare bank deposit
12.0.2.2 Make bank deposit
12.0.2.3 Write check
12.0.2.4 Cash check
12.0.2.5 Balance bank statement
12.0.2.6 Balance checking account

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Competency 12.0.3: Analyze marketing and sales opportunities

Competency Builders:

12.0.3.1 Determine methods of establishing a business
12.0.3.2 Select business location
12.0.3.3 Promote products and services
12.0.3.4 Market services
12.0.3.5 Prepare estimate
12.0.3.6 Develop pricing policies
12.0.3.7 Conduct sale

Competency 12.0.4: Ship merchandise

Competency Builders:

12.0.4.1 Follow general safety precautions
12.0.4.2 Record shipments
12.0.4.3 Load merchandise
12.0.4.4 Secure load
12.0.4.5 Prepare shipping documents
12.0.4.6 Arrange delivery
12.0.4.7 Determine delivery route
12.0.4.8 Process special orders
12.0.4.9 Process returns to vendors
12.0.4.10 Calculate shipping charges
12.0.4.11 Comply with government regulations

Competency 12.0.5: Keep customer accounts

Competency Builders:

12.0.5.1 Set up customer file
12.0.5.2 Identify importance of checking customer credit references
12.0.5.3 Post receipts
12.0.5.4 Balance customer accounts
12.0.5.5 Prepare statements
12.0.5.6 Prepare invoices

Competency 12.0.6: Minimize loss

Competency Builders:

12.0.6.1 Examine effect of theft or losses on profit
12.0.6.2 Identify potential loss situations
12.0.6.3 Maintain organized work area
12.0.6.4 Interpret laws regarding loss
12.0.6.5 Identify and follow business policy for handling instances of theft

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Competency 12.0.7: Manage business finance

Competency Builders:

12.0.7.1 Prepare budget
12.0.7.2 Calculate insurance needs
12.0.7.3 Identify sources of business capital
12.0.7.4 Interpret financial statements
12.0.7.5 Record accounts payable
12.0.7.6 Record accounts receivable
12.0.7.7 Prepare cash flow statements
12.0.7.8 Calculate overhead costs

Competency 12.0.8: Control inventory

Competency Builders:

12.0.8.1 Organize storage area
12.0.8.2 Conduct physical inventory
12.0.8.3 Determine quantity of bulk items
12.0.8.4 Maintain inventory records

Competency 12.0.9: Order merchandise

Competency Builders:

12.0.9.1 Determine when to order
12.0.9.2 Select vendors
12.0.9.3 Use vendor discounts
12.0.9.4 Calculate shipping charges
12.0.9.5 Determine amount of storage needed

Competency 12.0.10: Receive merchandise

Competency Builders:

12.0.10.1 Follow general safety precautions
12.0.10.2 Verify order
12.0.10.3 Unpack merchandise
12.0.10.4 Interpret packing slips and invoices
12.0.10.5 Check for discrepancies
12.0.10.6 Inspect merchandise for damage
12.0.10.7 Distribute merchandise

Competency 12.0.11: Perform public relations work

Competency Builders:

12.0.11.1 Explain forestry objectives
12.0.11.2 Prepare reports
12.0.11.3 Prepare literature
12.0.11.4 Obtain and interpret forestry information
12.0.11.5 Write news releases
12.0.11.6 Describe interaction with government agencies and other organizations

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Unit 13: Urban Forestry Tree Care

Competency 13.0.1: Prune trees

Competency Builders:

13.0.1.1 Follow general safety precautions
13.0.1.2 Identify and use pruning equipment
13.0.1.3 Maintain pruning equipment
13.0.1.4 Use proper pruning techniques
13.0.1.5 Identify effects of proper and improper pruning

Competency 13.0.2: Climb trees

Competency Builders:

13.0.2.1 Follow general safety precautions
13.0.2.2 Identify and use tree-climbing equipment
13.0.2.3 Tie common knots
13.0.2.4 Use ascending and descending techniques
13.0.2.5 Use working techniques in tree
13.0.2.6 Identify liability issues involved in tree climbing

Competency 13.0.3: Remove tree parts

Competency Builders:

13.0.3.1 Follow general safety precautions
13.0.3.2 Make removal cuts
13.0.3.3 Use various lowering techniques (e.g., rigging)
13.0.3.4 Estimate weight of tree parts by species
13.0.3.5 Make finish cuts
13.0.3.6 Identify hazardous tree conditions
13.0.3.7 Describe stump removal techniques

Competency 13.0.4: Dispose of debris

Competency Builders:

13.0.4.1 Follow general safety precautions
13.0.4.2 Operate and maintain chipper
13.0.4.3 Operate and maintain truck
13.0.4.4 Load tree parts
13.0.4.5 Describe alternative methods of debris disposal
13.0.4.6 Comply with government regulations regarding disposal of tree parts
13.0.4.7 Organize brush for disposal
13.0.4.8 Comply with government regulations for use and management of wood waste**

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Unit 14: Employability Skills
Subunit 14.1: Career Development

Competency 14.1.1: Investigate career options

Competency Builders:

14.1.1.1 Determine interests and aptitudes
14.1.1.2 Identify career options
14.1.1.3 Research occupations matching interests and aptitudes
14.1.1.4 Select career(s) that best match(es) interests and aptitudes
14.1.1.5 Identify advantages and disadvantages of career options, including nontraditional careers
14.1.1.6 Assess differences in wages, annual incomes, and job opportunities based on geographic location
14.1.1.7 Develop a career plan

Competency 14.1.2: Analyze potential barriers to employment

Competency Builders:

14.1.2.1 Identify common barriers to employment
14.1.2.2 Describe strategies to overcome employment barriers

Unit 14: Employability Skills
Subunit 14.2: Decision Making and Problem Solving

Competency 14.2.1: Apply decision-making techniques in the workplace

Competency Builders:

14.2.1.1 Identify the decision to be made
14.2.1.2 Compare alternatives
14.2.1.3 Determine consequences of each alternative
14.2.1.4 Make decisions based on values and goals
14.2.1.5 Evaluate the decision made

Competency 14.2.2: Apply problem-solving techniques in the workplace

Competency Builders:

14.2.2.1 Diagnose the problem and its causes
14.2.2.2 Identify alternatives and their consequences in relation to the problem
14.2.2.3 Examine multicultural and nonsexist dimensions of problem solving
14.2.2.4 Utilize resources to explore possible solutions to the problem
14.2.2.5 Compare and contrast the advantages and disadvantages of each solution
14.2.2.6 Determine appropriate action
14.2.2.7 Evaluate results

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Unit 14: Employability Skills
Subunit 14.3: Work Ethic

Competency 14.3.1: Evaluate the relationship of self-esteem to work ethic

Competency Builders:

14.3.1.1 Identify special characteristics and abilities in self and others
14.3.1.2 Identify internal and external factors that affect self-esteem

Competency 14.3.2: Analyze the relationship of personal values and goals to work ethic both in and out of the workplace

Competency Builders:

14.3.2.1 Distinguish between values and goals
14.3.2.2 Determine the importance of values and goals
14.3.2.3 Evaluate how values affect goals
14.3.2.4 Identify short-term and long-term goals
14.3.2.5 Prioritize personal goals
14.3.2.6 Describe how personal values are reflected in work ethic
14.3.2.7 Describe how interactions in the workplace affect personal work ethic
14.3.2.8 Examine how life changes affect personal work ethic

Competency 14.3.3: Demonstrate work ethic

Competency Builders:

14.3.3.1 Examine factors that influence work ethic
14.3.3.2 Exhibit characteristics that reflect an appropriate work ethic

Unit 14: Employability Skills
Subunit 14.4: Job-Seeking Skills

Competency 14.4.1: Prepare for employment

Competency Builders:

14.4.1.1 Identify traditional and nontraditional employment sources
14.4.1.2 Utilize employment sources
14.4.1.3 Research job opportunities, including nontraditional careers
14.4.1.4 Interpret equal employment opportunity laws
14.4.1.5 Explain the critical importance of personal appearance, hygiene, and demeanor throughout the employment process
14.4.1.6 Prepare for generic employment tests and those specific to an occupation/organization

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Competency 14.4.2: Design a résumé

Competency Builders:

14.4.2.1 Identify personal strengths and weaknesses
14.4.2.2 List skills and/or abilities, career objective(s), accomplishments/achievements, educational background, and work experience
14.4.2.3 Demonstrate legible written communication skills using correct grammar, spelling, and concise wording
14.4.2.4 Complete résumé using various formats
14.4.2.5 Secure references

Competency 14.4.3: Complete and process job application forms

Competency Builders:

14.4.3.1 Explain the importance of an application form
14.4.3.2 Identify ways to obtain job application forms
14.4.3.3 Describe methods for handling illegal questions on job application forms
14.4.3.4 Demonstrate legible written communication skills using correct grammar, spelling, and concise wording
14.4.3.5 Return application to proper person, request interview, and follow up

Competency 14.4.4: Demonstrate interviewing skills

Competency Builders:

14.4.4.1 Investigate interview environment and procedures
14.4.4.2 Explain the critical importance of personal appearance, hygiene, and demeanor
14.4.4.3 Demonstrate question and answer techniques
14.4.4.4 Demonstrate methods for handling difficult and/or illegal interview questions

Competency 14.4.5: Secure employment

Competency Builders:

14.4.5.1 Identify present and future employment opportunities within an occupation/organization
14.4.5.2 Research the organization/company
14.4.5.3 Use follow-up techniques to enhance employment potential
14.4.5.4 Compare and evaluate job offers

Unit 14: Employability Skills
Subunit 14.5: Job Retention Skills

Competency 14.5.1: Analyze the organizational structure of the workplace

Competency Builders:

14.5.1.1 Identify and evaluate employer expectations regarding job performance, work habits, attitudes, personal appearance, and hygiene
14.5.1.2 Be aware of and obey all company policies and procedures
14.5.1.3 Examine the role/relationship between employee and employer
14.5.1.4 Recognize opportunities for advancement and reasons for termination

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Competency 14.5.2: Maintain positive relations with others

Competency Builders:

14.5.2.1 Exhibit appropriate work habits and attitude
14.5.2.2 Identify behaviors to establish successful working relationships
14.5.2.3 Cooperate and compromise through teamwork and group participation
14.5.2.4 Identify alternatives for dealing with harassment, bias, and discrimination based on race, color, national origin, sex, religion, handicap, or age

Unit 14: Employability Skills
Subunit 14.6: Job Advancement

Competency 14.6.1: Analyze opportunities for personal and career growth

Competency Builders:

14.6.1.1 Determine opportunities within an occupation/organization
14.6.1.2 Compare and contrast other opportunities
14.6.1.3 List benefits of job advancement
14.6.1.4 Evaluate factors involved when assuming a new position within or outside an occupation/organization

Competency 14.6.2: Exhibit characteristics needed for advancement

Competency Builders:

14.6.2.1 Display a positive attitude
14.6.2.2 Demonstrate knowledge of a position
14.6.2.3 Perform quality work
14.6.2.4 Adapt to changing situations and technology
14.6.2.5 Demonstrate capability for different positions
14.6.2.6 Participate in continuing education/training programs
14.6.2.7 Respect, accept, and work with ALL individuals in the workplace

Unit 14: Employability Skills
Subunit 14.7: Technology in the Workplace

Competency 14.7.1: Assess the impact of technology in the workplace

Competency Builders:

14.7.1.1 Cite how past business/industry practices have influenced present business/industry processes
14.7.1.2 Investigate the use of technology in the workplace
14.7.1.3 Analyze how present skills can be applied to learning new technologies

Competency 14.7.2: Use a variety of technological applications

Competency Builders:

14.7.2.1 Explore basic mathematical, scientific, computer, and technological principles
14.7.2.2 Use technology to accomplish assigned tasks
14.7.2.3 Create solutions to problems using technical means

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Unit 14: Employability Skills
Subunit 14.8: Lifelong Learning

Competency 14.8.1: Apply lifelong learning to individual situations

Competency Builders:

14.8.1.1 Define lifelong learning
14.8.1.2 Identify factors that cause the need for lifelong learning

Competency 14.8.2: Adapt to change

Competency Builders:

14.8.2.1 Analyze the effects of change
14.8.2.2 Identify reasons why goals change
14.8.2.3 Describe the importance of flexibility when reevaluating goals
14.8.2.4 Evaluate the need for continuing education/training

Unit 14: Employability Skills
Subunit 14.9: Economic Education

Competency 14.9.1: Analyze global enterprise system

Competency Builders:

14.9.1.1 Identify characteristics of various enterprise systems
14.9.1.2 Examine the relationship between competition, risk, and profit
14.9.1.3 Illustrate how supply and demand influence price

Competency 14.9.2: Evaluate personal money management

Competency Builders:

14.9.2.1 Describe the need for personal management records
14.9.2.2 Identify methods of taxation
14.9.2.3 Analyze how credit affects financial security
14.9.2.4 Compare types and methods of investments
14.9.2.5 Prepare a personal budget
14.9.2.6 Be an informed and responsible consumer
14.9.2.7 Analyze the effects of advertising on the consumer

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Unit 14: Employability Skills
Subunit 14.10: Balancing Work and Family

Competency 14.10.1: Analyze the effects of family on work

Competency Builders:

14.10.1.1 Recognize how family values, goals, and priorities are reflected in the workplace
14.10.1.2 Identify present and future family structures and responsibilities
14.10.1.3 Describe personal and family roles
14.10.1.4 Analyze concerns of working parent(s)
14.10.1.5 Examine how family responsibilities can conflict with work
14.10.1.6 Resolve family-related conflicts
14.10.1.7 Explain how to use support systems/community resources to help resolve family-related conflicts

Competency 14.10.2: Analyze the effects of work on family

Competency Builders:

14.10.2.1 Identify responsibilities associated with paid and nonpaid work
14.10.2.2 Compare the advantages and disadvantages of multiple incomes
14.10.2.3 Explain how work can conflict with family responsibilities
14.10.2.4 Explain how work-related stress can affect families
14.10.2.5 Identify family support systems and resources

Unit 14: Employability Skills
Subunit 14.11: Citizenship in the Workplace

Competency 14.11.1: Exercise the rights and responsibilities of citizenship in the workplace

Competency Builders:

14.11.1.1 Identify the basic rights and responsibilities of citizenship
14.11.1.2 Examine the history and contributions of all racial, ethnic, and cultural groups

Competency 14.11.2: Cooperate with others in the workplace

Competency Builders:

14.11.2.1 Identify situations in which compromise is necessary
14.11.2.2 Examine how individuals from various backgrounds contribute to work-related situations
14.11.2.3 Demonstrate initiative to facilitate cooperation
14.11.2.4 Give and receive constructive criticism to enhance cooperation

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Unit 14: Employability Skills
Subunit 14.12: Leadership

Competency 14.12.1: Evaluate leadership styles appropriate for the workplace

Competency Builders:

14.12.1.1 Identify characteristics of effective leaders
14.12.1.2 Compare leadership styles
14.12.1.3 Demonstrate effective delegation skills
14.12.1.4 Identify opportunities to lead in the workplace

Competency 14.12.2: Demonstrate effective teamwork skills

Competency Builders:

14.12.2.1 Identify the responsibilities of a valuable group member
14.12.2.2 Exhibit open-mindedness
14.12.2.3 Identify methods of involving each member of a team
14.12.2.4 Contribute to the efficiency and success of a group
14.12.2.5 Determine ways to motivate others

Competency 14.12.3: Utilize effective communication skills

Competency Builders:

14.12.3.1 Identify the importance of listening
14.12.3.2 Demonstrate assertive communication
14.12.3.3 Recognize the importance of verbal and nonverbal cues and messages
14.12.3.4 Analyze written material
14.12.3.5 Prepare written material
14.12.3.6 Give and receive feedback
14.12.3.7 Articulate thoughts
14.12.3.8 Use appropriate language

Unit 14: Employability Skills
Subunit 14.13: Entrepreneurship

Competency 14.13.1: Evaluate the role of small business in the economy

Competency Builders:

14.13.1.1 Identify the benefits of small business to a community
14.13.1.2 Analyze opportunities for small business in a community

Competency 14.13.2: Examine considerations of starting a business

Competency Builders:

14.13.2.1 Research a business idea
14.13.2.2 Compare various ways to become a small business owner
14.13.2.3 Investigate factors to consider in financing a new business
14.13.2.4 Evaluate entrepreneurship as a career option

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